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CURRENT LITERATURE

BOOK REVIEWS

Chemistry of the higher fungi

Investigations on the chemistry of fungi began about a century ago, and have been prosecuted with various aims. Sometimes the endeavor has been to isolate unknown substances, and especially poisonous or medicinal ones; sometimes to ascertain the nutritive value of edible species; and sometimes to contribute to the general knowledge of this group. Though the separate studies have been numerous, hardly more than a beginning has yet been made, as shown by the fact that out of the immense number of species, the chemistry of only four is known with even approximate completeness.

ZELLNER, who himself has contributed much to the subject, has collated the present data in a monograph of some 250 pages.¹ He excludes from his consideration, by the adjective "higher," the bacteria, molds, and yeasts, recognizing that this is nothing more than a convenient discrimination. The matter is not arranged by species or groups of fungi, but by groups of substances, such as mineral constituents, fats, alcohols, amino-acids, tannins, coloring matters, toxins, etc. The largest sections are those which treat of fats, bases, carbohydrates, and enzymes. To compensate for the disadvantages of this mode of presentation, the author furnishes a complete index of the names of species mentioned, which unfortunately he has separated from the index of substances mentioned. While an index is a good thing, two are never better than one.

In the way of generalizations the author gathers together, at the close of his volume, the information in regard to the four species, whose composition has been fairly determined. It may be interesting to know that these are *Amanita muscaria* L., *Polyporus officinalis* Fr., *Claviceps purpurea* Tul., and *Aethalium septicum* L. He also attempts to distinguish by their chemical characteristics the following groups, whose composition is dependent upon the substratum: (1) saprophytes (living in humus), (2) coprophytes, (3) wood dwellers, partly saprophytic, partly parasitic, (4) plant parasites, (5) animal parasites.

Regarding the higher fungi as a whole, ZELLNER notes these chemical peculiarities: the cell membrane consists chiefly of chitin, or an allied substance, fungin, true cellulose and true wood material never having been found in fungi; they likewise contain no starch, but dextrin-like carbohydrates or glycogen are widely distributed, though in variable amounts; the fats are mostly rich in free fatty acids, associated with bodies of the ergosterin group and mostly also lecithins; basic

¹ ZELLNER, J., *Chemie der höheren Pilze*. 8vo. pp. vi + 257. Leipzig: Wilhelm Engelmann. 1907. *M* 9.

bodies, allied to trimethylamin, are widely distributed, but no true alkaloid has yet been found. The composition of fungi and animals shows some striking resemblances.

In gathering together the data regarding the chemistry of the higher fungi, in citing the literature, and in describing methods of isolation and identification, ZELLNER supplements acceptably the related sections of CZAPEK'S *Biochemie der Pflanzen* and facilitates further studies in this field.—C. R. B.

"Sleep" movements

In a monograph of some two hundred pages PFEFFER² describes his recent investigations on the so-called "sleep" movements of leaves. For these researches he has planned ingenious methods of securing the self-registration of the movements of simple leaves, or the folding of a number of leaflets. In addition to the clever arrangements of levers, he has devised several forms of registering apparatus, and methods for continuous and intermittent illumination, in which the disturbing effects of varying temperature are eliminated, and at will a sudden or gradual illumination is secured, by electric tungsten or mercury lamps, without sparking at the contacts. These methods and apparatus will doubtless prove of very great service, not only in the study of "sleep" movements, but also wherever, as in this case, optical methods of record are not suitable.

The records published in this monograph, giving for the first time the autographs of leaves subjected to varying conditions of light and temperature, are likely to become classic illustrations. They show not only the so-called "sleep" movements, but also the independent autonomous movements which often accompany them, and the interesting rhythmic movements that persist for some time when the leaves are kept in uniform conditions. The work is one which will take its place with other monographs of this author as a permanent contribution to plant physiology. The contribution, however, lies rather in the useful apparatus and in the direct results recorded than in any theoretical considerations which are deducible.

The "sleep" movements, whether they are executed by growth or turgor, are herein definitely shown to be photonastic or thermonastic reactions, called forth by the daily change of illumination or temperature, or by the co-operation of both factors. That being the case it is to be regretted that the author does not adopt some more suitable term than the misleading *Schlafbewegungen*. When under constant conditions the "sleep" movements gradually disappear in 3-5 days through after-movements of diminishing amplitude, there often remain autonomous movements of much shorter rhythm, which are quite independent of the others. Many specific peculiarities in the responses are described, which cannot be here enumerated. Thermonastic responses show similar peculiarities and the photonastic reactions seem bound up, to a certain extent, with them, since in most leaves thermonastic responses may be induced when the photonastic ones have

² PFEFFER, W., Untersuchungen über die Entstehung der Schlafbewegungen der Blattorgane. Abh. Math.-phys. Kl. Königl. Sächs. Gesells. Wiss. 30: 259-472. figs. 36. 1907. Separately of B. G. Teubner, Leipzig. M 8.